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## Data Sheet



# SCA3100-D07 3-AXIS HIGH PERFORMANCE ACCELEROMETER WITH DIGITAL SPI INTERFACE

## Features

- 3.3V supply voltage
- $\pm 6$  g measurement range
- 3-axis measurement XYZ directions
- $\pm 70$ mg offset accuracy over temp range
- Internal temperature sensor
- SPI digital interface
- Enhanced self diagnostics features
- Size 7.6 x 3.3 x 8.6 mm (w x h x l)
- Qualified according to AEC-Q100 standard
- Package, pin-out and SPI protocol compatible with VTI digital accelerometer product family
- RoHS compliant Dual Flat Lead (DFL) plastic package suitable for lead free soldering process and SMD mounting
- Proven capacitive 3D-MEMS technology

## Applications

SCA3100-D07 is targeted to automotive applications with high stability requirements and vibration robustness. Typical applications include

- Electronic Stability Control (ESC)
- Hill Start Aid (HSA)
- Electronic Parking Brake (EPB)
- Roll Over
- Suspension
- Inclination
- Integrated inertial measurement
- Industrial applications

## General Description

SCA3100-D07 is a high performance two axis accelerometer component based on VTI capacitive 3D-MEMS technology. The component integrates high accuracy micromechanical acceleration sensing together with a flexible SPI digital interface. Dual Flat Lead (DFL) housing of the component guarantees robust operation over the product lifetime.

SCA3100-D07 is designed, manufactured and tested for high stability, reliability and quality requirements of automotive applications. The accelerometer has extremely stable output over wide range of temperature, humidity and mechanical noise. The component is qualified against AEC-Q100 standard and has several advanced self diagnostics features. The DFL housing is suitable for SMD mounting and the component is compatible with RoHS and ELV directives.

SCA3100-D07 is a part of VTI digital accelerometer family and fully compatible with single axis accelerometers (SCA800 series) and other multi axis accelerometers (SCA2100 series and SCA3100 series).

## Performance Characteristics

V<sub>dd</sub>=3.3 V and ambient temperature unless otherwise specified.

| Parameter                                   | Condition                             |      |      |        | Units   |
|---|---------------------------------------|------|------|--------|---------|
|   |                                       | Min  | Typ  | Max    |         |
| Analog and digital V <sub>dd</sub>          |                                       | 3.0  |      | 3.6    | V       |
| Current consumption                         | Active mode                           |      | 3    | 5      | mA      |
|   | Power down mode                       |      | 0.05 |        | mA      |
| Measurement range <sup>A)</sup>             | Measurement axes (XYZ)                | -6   |      | 6      | g       |
| Saturation warning limit <sup>B)</sup>      | Measurement axes (XYZ)                |      | 6.3  |        | g       |
| Operating temperature                       |                                       | -40  |      | 125    | °C      |
| Offset total error <sup>C)</sup>            | Temperature range -40 ... +125 °C     | -100 |      | 100    | mg      |
|   | RT 25 °C ±5°C                         | -50  |      | 50     | mg      |
| Offset temperature dependency <sup>D)</sup> | Temperature range -40 ... +125 °C     | -70  |      | 70     | mg      |
| Sensitivity                                 | 13 bit output                         |      | 650  |        | Count/g |
| Total sensitivity error                     |                                       | -3   |      | 3      | % FS    |
| Linearity error                             | +1g ... -1g range                     | -20  |      | 20     | mg      |
|   | +3g...+1g, -1g...-3g                  | -40  |      | 40     | mg      |
|   | +5g..+3g, -3g..-5g                    | -60  |      | 60     | mg      |
| Cross-Axis sensitivity                      |                                       |      |      | ±3.5   | %       |
| Zero acceleration output                    | 2-complement                          |      | 0    |        | Counts  |
| Amplitude response <sup>E)</sup>            | -3dB frequency                        | 30   |      | 55     | Hz      |
| Noise                                       |                                       |      |      | 10     | mg RMS  |
| Power on setup time                         |                                       |      |      | 0.1    | s       |
| Output data rate                            |                                       |      | 2000 |        | Hz      |
| Output load                                 |                                       |      |      | 50     | pF      |
| SPI clock rate                              |                                       |      |      | 8      | MHz     |
| ESD protection                              | Human Body Model                      |      |      | 2      | kV      |
|   | Charged Device Model                  |      |      | 1      | kV      |
| Moisture sensitivity level                  | IPC/JEDEC J-STD-020C, Level 3         |      |      |        |         |
| Mechanical shock                            |                                       |      |      | 20 000 | g       |
| ID register value                           | Customer readable ID register (27hex) |      | C4   |        |         |

- A) Range defined as ball sphere  $\sqrt{x^2+y^2+z^2} \leq 6g$
- B) See product family specification for details on SAT-bit handling
- C) Includes offset deviation from 0g value including calibration error and change over lifetime, temperature and supply voltage.
- D) Offset dependency due to temperature. Value is a relative value and has not to be centered to zero.
- E) See figure 4.

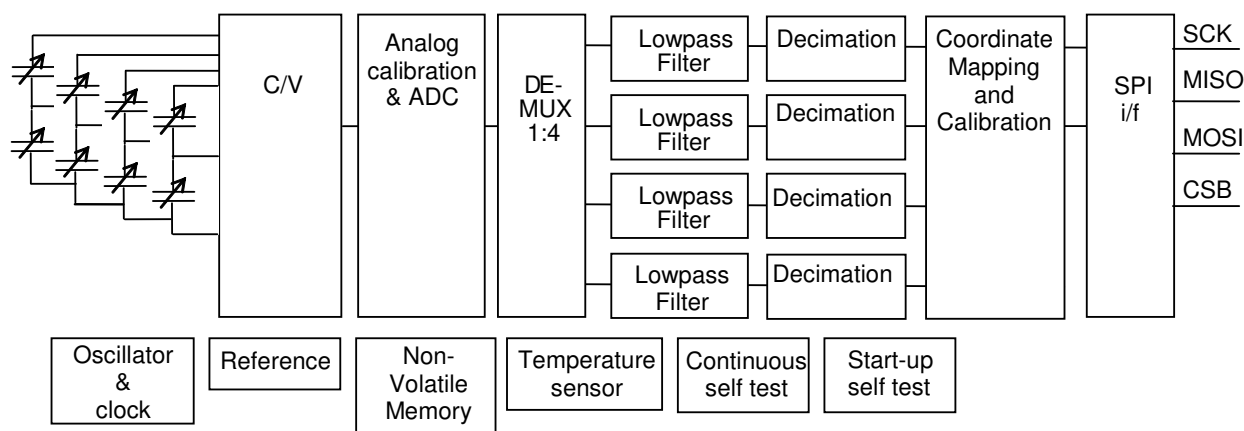


Figure 1. SCA3100-D07 Block diagram



### Measurement directions

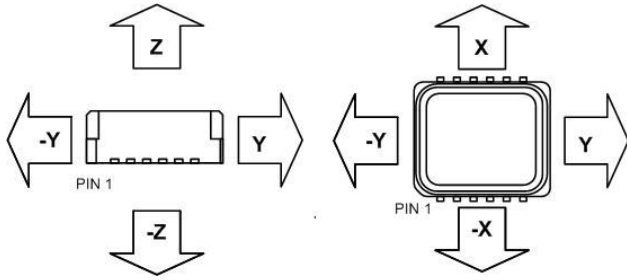


Figure 2. Accelerometer measuring directions

### Housing dimensions

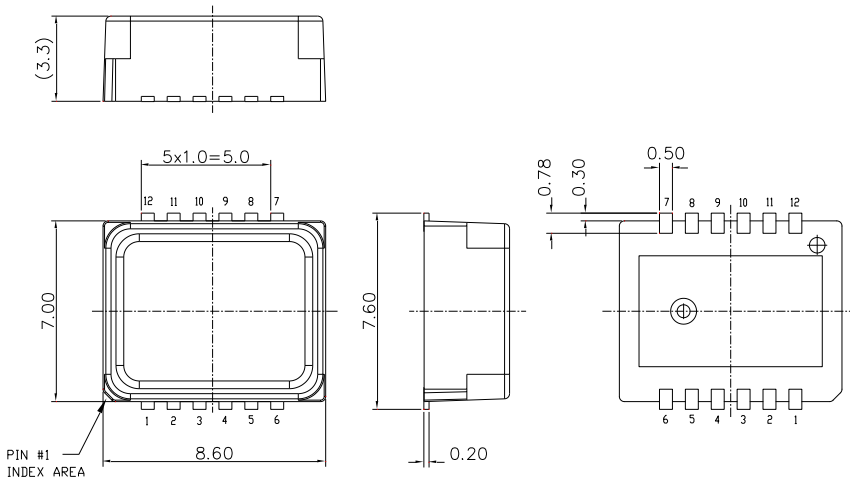


Figure 3. Housing dimensions

### Frequency response

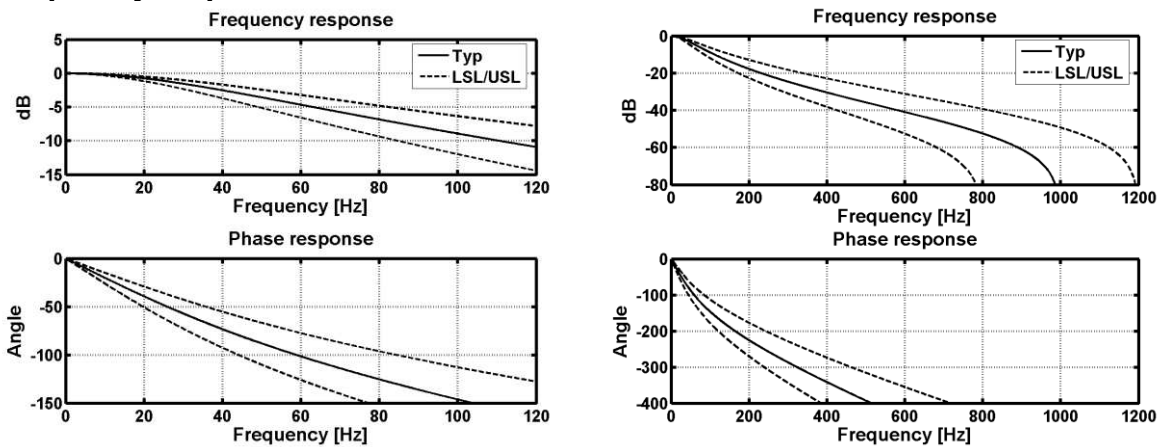


Figure 4. Frequency response curve